

Patent Claims

- 1 Apparatus for determining and/or monitoring at least one physical or
5 chemical process variable of a medium, comprising at least one mechanically
oscillatable unit (1) which includes a tube (2) and an internal oscillator (3),
wherein the tube (2) is connected with a securement unit (5) with an end (4)
turned away from the process,
wherein an end (6) of the tube (2) turned toward the process is embodied as a
10 free end,
wherein the tube (2) surrounds the inner oscillator (3), and
wherein the internal oscillator (3) is secured to the end (6) of the tube (2) turned
toward the process with an end (7) turned toward the process,
and
15 further comprising at least one driving/receiving unit (8),
wherein the driving/receiving unit (8) excites the mechanically oscillatable unit (1)
to oscillate, respectively
wherein the driving/receiving unit (8) receives the oscillations of the mechanically
oscillatable unit (1),
20 characterized in that
the internal oscillator (3) has at least one groove/neck (9),
which determines at least the oscillation frequency of the mechanically
oscillatable unit (1).
- 25 2. Apparatus as claimed in claim 1,
characterized in that
the groove/neck (9) is located in the direction of the end (7) of the internal
oscillator (3) turned toward the process.

3. Apparatus as claimed in claim 1 or 2,
characterized in that
an additional weight (12) is provided in the securement unit (5).
- 5 4. Apparatus as claimed in claim 1 or 2,
characterized in that
the tube (2) and/or the internal oscillator (3) have/has a round, elliptical, square
or polygonal cross section.
- 10 5. Apparatus as claimed in claim 1, 2 or 4,
characterized in that
the internal oscillator (3) is hollow, solid or partially hollow and partially solid.
6. Apparatus as claimed in claim 1 or 2,
15 characterized in that,
in the driving/receiving unit (8), only a single piezo unit (16) is provided, which
serves as driving, and as receiving, unit.
7. Apparatus as claimed in claim 1 or 2,
20 characterized in that,
in the driving/receiving unit (8), at least two piezo units (16) are provided, wherein
at least one piezo unit (16) serves as driving unit and at least one piezo unit (16)
serves as receiving unit, wherein the piezo units (16) are positioned at the same
position.
- 25 8. Apparatus as claimed in claim 6 or 7,
characterized in that
the piezo unit (16) is a piezoelectric element, which is composed of at least two
segments, which are polarized in mutually opposite directions, wherein the

polarization directions lie parallel to an axis of rotation (14) of the mechanically oscillatable unit (1).

9. Apparatus as claimed in claim 1, 2, 6, 7 or 8,
5 characterized in that,
the driving/receiving unit (8) is positioned between the end (7) of the internal oscillator (3) turned toward the process and the end (6) of the tube (2) turned toward the process.

10 10. Apparatus as claimed in claim 1, 2, 6, 7 or 8,
characterized in that
the internal oscillator (3) has at least a second groove/neck (19).

11. Apparatus as claimed in claim 10,
15 characterized in that
the driving/receiving unit (8) is positioned between the first groove/neck (9) and the second groove/neck (19).